Working Group #3 :
Standard stars and Surface Brightness - Color Relations (SBCR)

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Ideal aim with SPICA: To observe any kind of stars (spectral types and luminosity classes) and with good statistics !

Targets selection : some good ideas ….

- Start from the JSDC (Chelli et al.), and focus on stable stars, excluding all variable stars and spotty stars (from light curve) , all fast rotators, …

 - Keep an overlap with the stars already included in the JMDC (Duvert et al.), ie with available measurements

- Select stars with good Gaia data and good photometry (for fundamental parameters) + binary flag (from Gaia)

- Select ecliptic targets to benefit from ESO instruments (for complementary observations) and Armazones polish facilities (for V and K ? Photometry)

SESSION 1 : SBCR : definition of scientific objectives

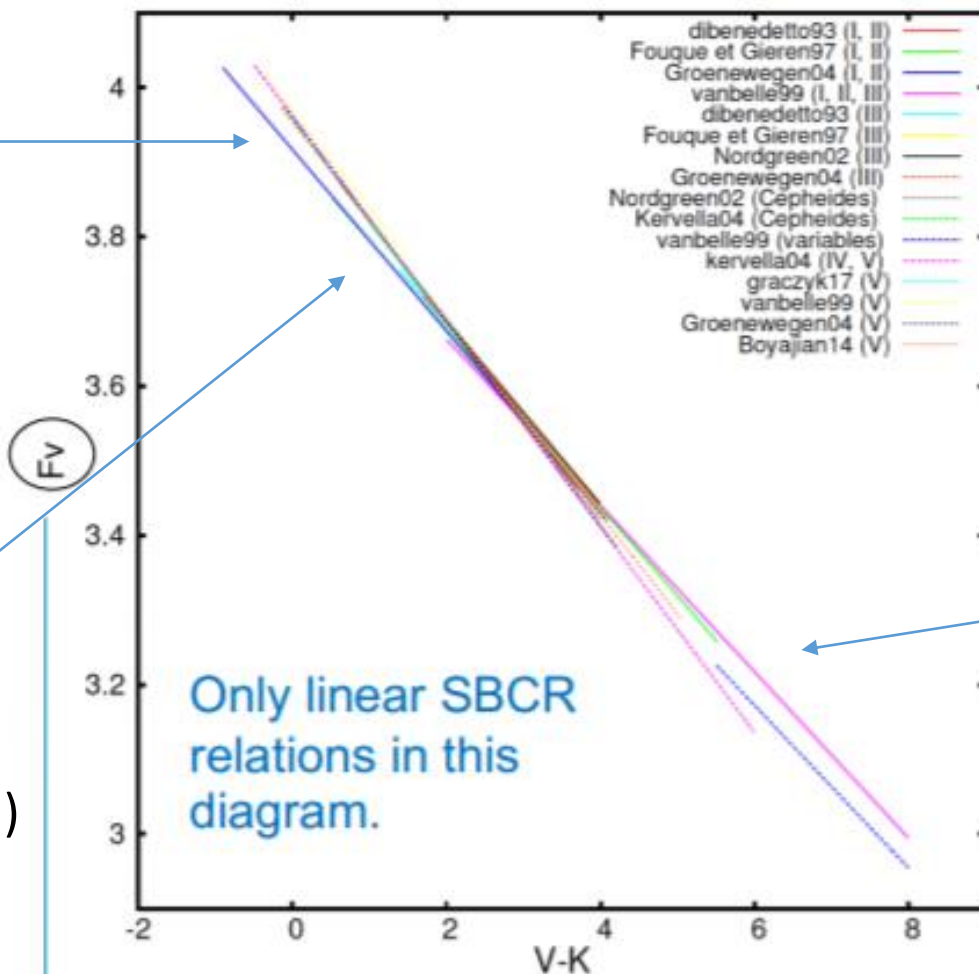**Too few O stars** to be observed with SPICA !
+ impact of winds, rotation, binarity
Requirement : a 3% relation would be *beautiful* !
But characterization would be good (binaries)

Effort with SPICA on B and A stars (but impact of rotation)
Requirement : a 2% relation would be very good !

Only linear SBCR relations in this diagram.

Linked to mV and the angular diameter

Aim : provide the **tool to PLATO** to apply **SBCR for faint stars from F5 to M dwarfs/subgiants**
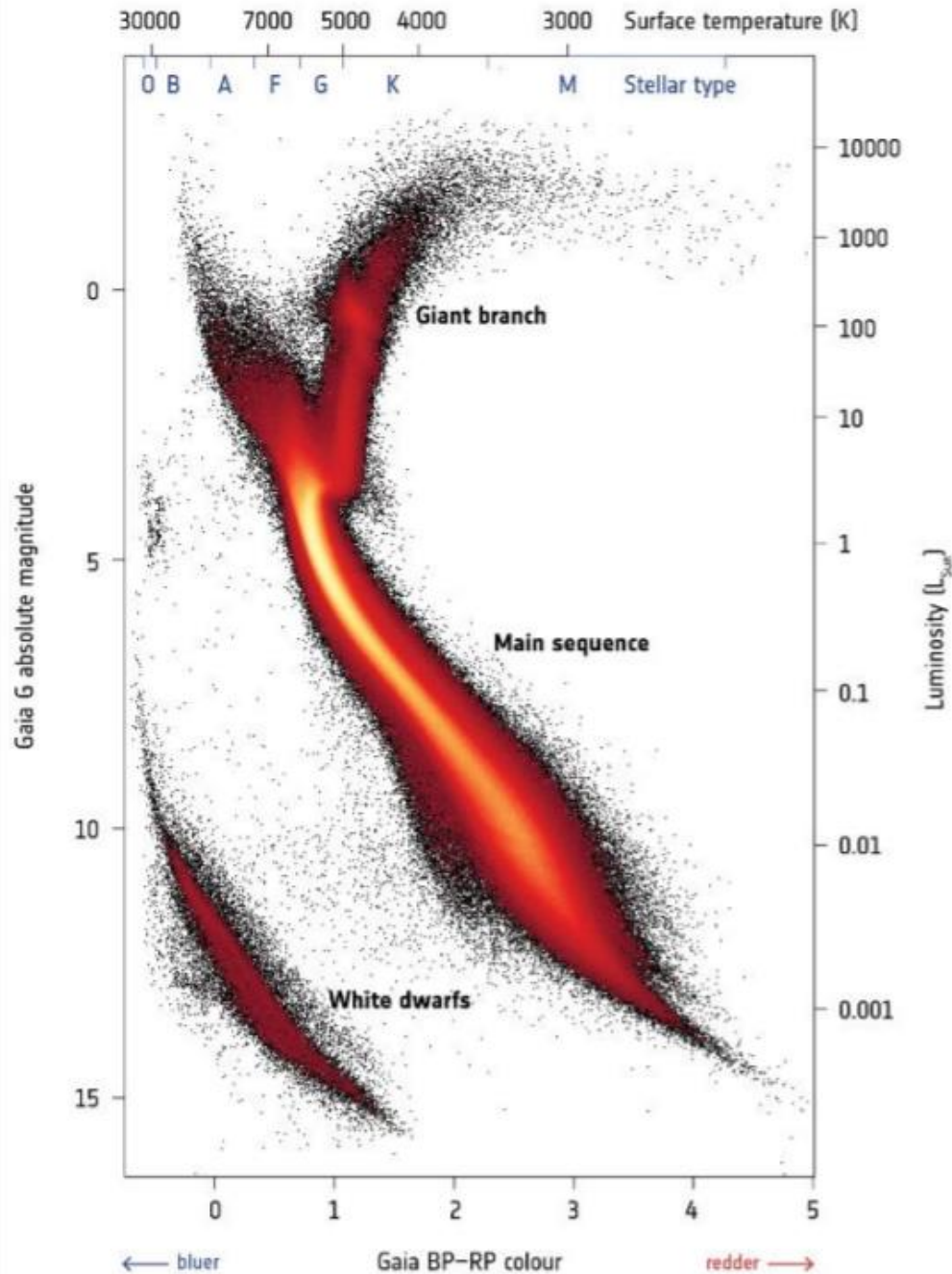**Requirement : 1% precision on SBCR**

=> observe a sample of Dwarfs, of Subgiants, of Giants (to sample Teff and gravity).
=> need for LD models, photometry, reddening correction

Few M dwarfs to be observed with SPICA (while a lot with PLATO !)
But those targets are interesting for characterization…

On **SBCR**, explore :
- **the impact of luminosity classes** (dwarfs- subgiants - giants)

- **the linearity of relation** for **late type stars** (K – M stars, dwarfs/giants)

- **the impact of the metallicity**

- **the synthetic SBCR,** built from different model atmospheres (dwarfs and giants)

=> **production of dedicated SBCR** for space missions (PLATO, TESS) in their filters

SESSION 2 : how to derive fundamental parameters (Age, M*, Teff) ?

SPICA can only provide reliable   R* (with good Gaia data) and M* (for binaries)
$\Rightarrow$ R* and M* enough at least for standard stars (*ie,* not the seismic ones)

SPICA will observe bright stars
=> look in the spectro archives for Teff, log g   as (good ?) inputs
          + also Gaia RVS Teff and log g (but large uncertainty)

$\Rightarrow$Teff would may be better determined from Teff-color relations

$\Rightarrow$ with M* and Teff, possible to test evolutionary models
   (can be done already from the available interferometric measurements)